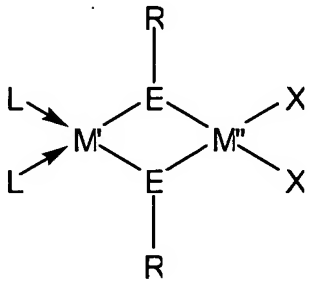
Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (canceled)

2. (currently amended) A single source precursor ~~according to claim 1,~~ for the deposition of ternary chalcopyrite materials, said single source precursor having a structural formula selected from the group consisting of



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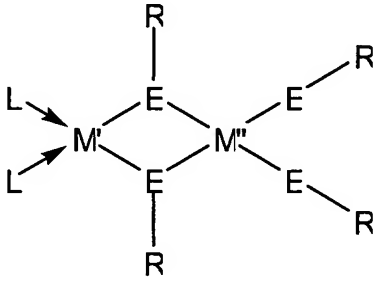


wherein L is a Lewis base that is coordinated to M' via a dative bond, M' is a Group I-B atom, M" is a Group III-A atom, E is a Group VI-A atom, X is a Group VII-A atom, and each R is individually selected from the group consisting of alkyl, aryl, vinyl, perfluoro alkyl, perfluoro aryl, silane, and carbamato groups, said single source precursor excluding

[{P(C_6H_5)$_3$}$_2$Cu(S-C_2H_5)$_2$In(S-C_2H_5)$_2$],

[{P(C_6H_5)$_3$}$_2$Cu(Se-C_2H_5)$_2$In(Se-C_2H_5)$_2$],

[{P(C_6H_5)$_3$}$_2$Cu(S(*i*-C_4H_9))$_2$In(S(*i*-C_4H_9))$_2$],

[{P(C_6H_5)$_3$}$_2$Cu(Se(*i*-C_4H_9))$_2$In(Se(*i*-C_4H_9))$_2$],

[{P(C_6H_5)$_3$}$_2$Ag(Cl)(SC{O}CH_3)In(SC{O}CH_3)$_2$],

[{P(C_6H_5)$_3$}$_2$Ag(Cl)(SC{O}C_6H_5)In(SC{O}C_6H_5)$_2$],

[{P(C_6H_5)$_3$}$_2$Ag(SC{O}CH_3)$_2$In(SC{O}CH_3)$_2$],

[{P(C_6H_5)$_3$}$_2$Ag(SC{O}C_6H_5)$_2$In(SC{O}C_6H_5)$_2$],

[{P(C_6H_5)$_3$}$_2$Cu(SC{O}C_6H_5)$_2$In(SC{O}C_6H_5)$_2$],

[{P(C_6H_5)$_3$}$_2$Cu(SC{O}C_6H_5)$_2$Ga(SC{O}C_6H_5)$_2$],

[{P(C_6H_5)$_3$}$_2$Ag(SC{O}C_6H_5)$_2$Ga(SC{O}C_6H_5)$_2$], and

[{P(C_6H_5)$_3$}$_2$Ag(SC{O}CH_3)$_2$Ga(SC{O}CH_3)$_2$].

3. (original) A single source precursor according to claim 2, said singles source precursor being a liquid at room temperature.

4. (original) A single source precursor according to claim 3, said single source precursor being soluble in polar organic solvents and in non-polar organic solvents.

5. (original) A single source precursor according to claim 2, of the formula $[\{P(n\text{-}C_4H_9)_3\}_2Cu(Se\text{-}C_6H_5)_2In(Se\text{-}C_6H_5)_2]$.

6. (original) A single source precursor according to claim 2, of the formula $[\{P(n\text{-}C_4H_9)_3\}_2Ag(S\text{-}C_2H_5)_2In(S\text{-}C_2H_5)_2]$.

7. (original) A single source precursor according to claim 2, of the formula $[\{P(n\text{-}C_4H_9)_3\}_2Cu(S\text{-}C_2H_5)_2In(S\text{-}C_2H_5)_2]$.

8. (original) A single source precursor according to claim 2, of the formula $[\{P(n\text{-}C_4H_9)_3\}_2Cu(S\text{-}C_3H_7)_2In(S\text{-}C_3H_7)_2]$.

9. (original) A single source precursor according to claim 2, of the formula $[\{P(C_6H_5)_3\}_2Ag(S\text{-}CH_3)_2In(S\text{-}CH_3)_2]$.

10. (original) A single source precursor according to claim 2, said single source precursor being effective to yield a I-III-VI_2 ternary chalcopyrite material upon heating or pyrolysis of said single source precursor at a temperature less than about 500°C.

11. (original) A single source precursor according to claim 2, said single source precursor being effective to yield a ternary chalcopyrite material having a band gap of about 1.5 eV between a conduction band and a valence band thereof.

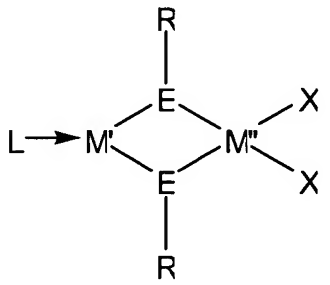
12. (original) A single source precursor according to claim 11, said ternary chalcopyrite material being $CuInS_2$.

13. (original) A single source precursor according to claim 2, said single source precursor being effective to yield a ternary chalcopyrite material having a band gap of about 2 eV between a conduction band and a valence band thereof.

14. (original) A single source precursor according to claim 13, said ternary chalcopyrite material being $CuGaS_2$.

15. (original) A single source precursor according to claim 2, said single source precursor being effective to yield a ternary chalcopyrite material having a band gap of 1.5-2 eV between a conduction band and a valence band thereof, said ternary chalcopyrite material being $Cu(In:Ga)(S:Se)_2$.

16. (currently amended) A single source precursor ~~according to claim 1,~~ for the deposition of ternary chalcopyrite materials, said single source precursor having a structural formula selected from the
group consisting of



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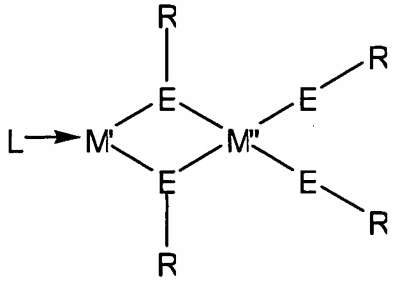


wherein L is a Lewis base that is coordinated to M' via a dative bond, M' is a Group I-B atom, M" is a Group III-A atom, E is a Group VI-A atom, X is a Group VII-A atom, and each R is individually selected from the group consisting of alkyl, aryl, vinyl, perfluoro alkyl, perfluoro aryl, silane, and carbamato groups.

17. (original) A single source precursor according to claim 16, said single source precursor being effective to yield a I-III-VI_2 ternary chalcopyrite material upon heating or pyrolysis of said single source precursor at a temperature less than about 500°C.

18. (original) A single source precursor according to claim 16, said single source precursor being effective to yield a ternary chalcopyrite material having a band gap of about 1.5 eV between a conduction band and a valence band thereof.

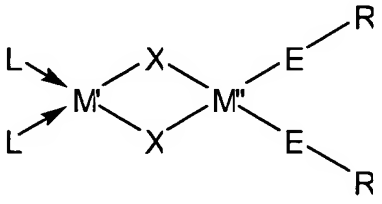
19. (original) A single source precursor according to claim 18, said ternary chalcopyrite material being $CuInS_2$.

20. (original) A single source precursor according to claim 16, said single source precursor being effective to yield a ternary chalcopyrite material having a band gap of about 2 eV between a conduction band and a valence band thereof.

21. (original) A single source precursor according to claim 20, said ternary chalcopyrite material being $CuGaS_2$.

22. (original) A single source precursor according to claim 16, said single source precursor being effective to yield a ternary chalcopyrite material having a band gap of 1.5-2 eV between a conduction band and a valence band thereof, said ternary chalcopyrite material being $Cu(In:Ga)(S:Se)_2$.

23. (currently amended) A single source precursor ~~according to claim 1,~~ for the deposition of ternary chalcopyrite materials, said single source precursor having a structural formula selected from the group consisting of



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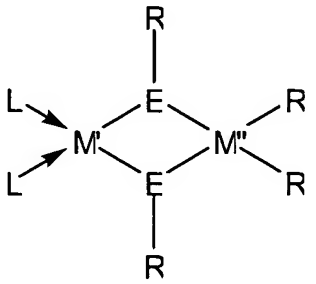


wherein L is a Lewis base that is coordinated to M' via a dative bond, M' is a Group I-B atom, M" is a Group III-A atom, E is a Group VI-A atom, X is a Group VII-A atom, and each R is individually selected from the group consisting of alkyl, aryl, vinyl, perfluoro alkyl, perfluoro aryl, silane, and carbamato groups.

24. (original) A single source precursor according to claim 23, said single source precursor being effective to yield a I-III-VI_2 ternary chalcopyrite material upon heating or pyrolysis of said single source precursor at a temperature less than about 500°C.

25. (original) A single source precursor according to claim 23, said single source precursor being effective to yield a ternary chalcopyrite material having a band gap of about 1.5 eV between a conduction band and a valence band thereof.

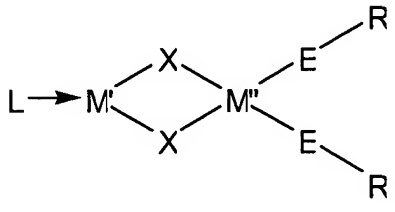
26. (original) A single source precursor according to claim 25, said ternary chalcopyrite material being $CuInS_2$.

27. (original) A single source precursor according to claim 23, said single source precursor being effective to yield a ternary chalcopyrite material having a band gap of about 2 eV between a conduction band and a valence band thereof.

28. (currently amended) A single source precursor according to claim 27, said ternary chalcopyrite material being ~~CuGaS~~ $CuGaS_2$.

29. (original) A single source precursor according to claim 23, said single source precursor being effective to yield a ternary chalcopyrite material having a band gap of 1.5-2 eV between a conduction band and a valence band thereof, said ternary chalcopyrite material being $Cu(In:Ga)(S:Se)_2$.

30. (currently amended) A single source precursor ~~according to claim 1,~~ for the deposition of ternary chalcopyrite materials, said single source precursor having a structural formula selected from the group consisting of



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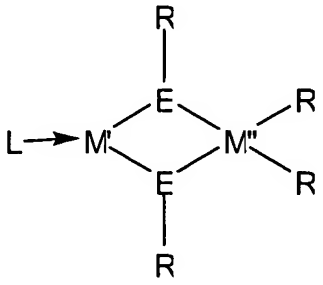


wherein L is a Lewis base that is coordinated to M' via a dative bond, M' is a Group I-B atom, M" is a Group III-A atom, E is a Group VI-A atom, X is a Group VII-A atom, and each R is individually selected from the group consisting of alkyl, aryl, vinyl, perfluoro alkyl, perfluoro aryl, silane, and carbamato groups.

31. (original) A single source precursor according to claim 30, said single source precursor being effective to yield a I-III-VI_2 ternary chalcopyrite material upon heating or pyrolysis of said single source precursor at a temperature less than about 500°C.

32. (original) A single source precursor according to claim 30, said single source precursor being effective to yield a ternary chalcopyrite material having a band gap of about 1.5 eV between a conduction band and a valence band thereof.

33. (original) A single source precursor according to claim 32, said ternary chalcopyrite material being $CuInS_2$.

34. (original) A single source precursor according to claim 30, said single source precursor being effective to yield a ternary chalcopyrite material having a band gap of about 2-2.4 eV between a conduction band and a valence band thereof.

35. (original) A single source precursor according to claim 34, said ternary chalcopyrite material being $CuGaS_2$.

36. (original) A single source precursor according to claim 30, said single source precursor being effective to yield a ternary chalcopyrite material having a band gap of 1.5-2 eV between a conduction band and a valence band thereof, said ternary chalcopyrite material being $Cu(In:Ga)(S:Se)_2$.

37. (currently amended) A single source precursor ~~according to claim 1, having three E-R groups~~ for the deposition of ternary chalcopyrite materials, said single source precursor having the empirical formula $[\{L\}_nM'(ER)_x(X)_y(R)_zM"]$, wherein x is 3, x+y+z=4, n is greater than or equal to 1, L is a Lewis base that is coordinated to M' via a dative bond, M' is a Group I-B atom,

M" is a Group III-A atom, E is a Group VI-A atom, X is a Group VII-A atom, and each R is individually selected from the group consisting of alkyl, aryl, vinyl, perfluoro alkyl, perfluoro aryl, silane, and carbamato groups, said single source precursor excluding

$[\{P(C_6H_5)_3\}_2Cu(S\text{-}C_2H_5)_2In(S\text{-}C_2H_5)_2]$,

$[\{P(C_6H_5)_3\}_2Cu(Se\text{-}C_2H_5)_2In(Se\text{-}C_2H_5)_2]$,

$[\{P(C_6H_5)_3\}_2Cu(S(i\text{-}C_4H_9))_2In(S(i\text{-}C_4H_9))_2]$,

$[\{P(C_6H_5)_3\}_2Cu(Se(i\text{-}C_4H_9))_2In(Se(i\text{-}C_4H_9))_2]$,

$[\{P(C_6H_5)_3\}_2Ag(Cl)(SC\{O\}CH_3)In(SC\{O\}CH_3)_2]$,

$[\{P(C_6H_5)_3\}_2Ag(Cl)(SC\{O\}C_6H_5)In(SC\{O\}C_6H_5)_2]$,

$[\{P(C_6H_5)_3\}_2Ag(SC\{O\}CH_3)_2In(SC\{O\}CH_3)_2]$,

$[\{P(C_6H_5)_3\}_2Ag(SC\{O\}C_6H_5)_2In(SC\{O\}C_6H_5)_2]$,

$[\{P(C_6H_5)_3\}_2Cu(SC\{O\}C_6H_5)_2In(SC\{O\}C_6H_5)_2]$,

$[\{P(C_6H_5)_3\}_2Cu(SC\{O\}C_6H_5)_2Ga(SC\{O\}C_6H_5)_2]$,

$[\{P(C_6H_5)_3\}_2Ag(SC\{O\}C_6H_5)_2Ga(SC\{O\}C_6H_5)_2]$, and

$[\{P(C_6H_5)_3\}_2Ag(SC\{O\}CH_3)_2Ga(SC\{O\}CH_3)_2]$.

38. (original) A single source precursor for the deposition of ternary chalcopyrite materials, said single source precursor being a liquid at room temperature and being effective to yield a ternary chalcopyrite material upon heating or pyrolysis thereof.

39. (original) A single source precursor according to claim 38, said single source precursor being effective to yield a I-III-VI_2 ternary chalcopyrite material upon heating or pyrolysis of said single source precursor at a temperature less than about 500°C.

40. (currently amended) A method of depositing ternary chalcopyrite materials comprising the steps of:

a) providing a first single source precursor for said ternary chalcopyrite material, said first single source precursor having the empirical formula $[\{L\}_nM'(ER)_x(X)_y(R)_zM"]$, wherein x is 1-4, x+y+z=4, n is greater than or equal to 1, L is a Lewis base that is coordinated to M' via a dative bond, M' is a Group I-B atom, M" is a Group III-A atom, E is a Group VI-A atom, X is a Group VII-A atom, and each R is individually selected from the group consisting of alkyl, aryl,

vinyl, perfluoro alkyl, perfluoro aryl, silane, and carbamato groups, said single source precursor excluding

~~$[\{P(C_6H_5)_3\}_2Cu(S\text{-}C_2H_5)_2In(S\text{-}C_2H_5)_2]$,~~

~~$[\{P(C_6H_5)_3\}_2Cu(SC\{O\}C_5H_6)_2In(SC\{O\}C_5H_6)_2]$,~~

~~$[\{P(C_6H_5)_3\}_2Cu(SC\{O\}C_5H_6)_2Ga(SC\{O\}C_5H_6)_2]$,~~

~~$[\{P(C_6H_5)_3\}_2Ag(SC\{O\}C_5H_6)_2In(SC\{O\}C_5H_6)_2]$,~~

~~$[\{P(C_6H_5)_3\}_2Ag(SC\{O\}C_5H_6)_2Ga(SC\{O\}C_5H_6)_2]$,~~

~~$[\{P(C_6H_5)_3\}_2Ag(SC\{O\}CH_3)_2In(SC\{O\}CH_3)_2]$, and~~

~~$[\{P(C_6H_5)_3\}_2Ag(SC\{O\}CH_3)_2Ga(SC\{O\}CH_3)_2]$~~

$[\{P(C_6H_5)_3\}_2Cu(S\text{-}C_2H_5)_2In(S\text{-}C_2H_5)_2]$,

$[\{P(C_6H_5)_3\}_2Cu(SC\{O\}C_6H_5)_2In(SC\{O\}C_6H_5)_2]$,

$[\{P(C_6H_5)_3\}_2Cu(SC\{O\}C_6H_5)_2Ga(SC\{O\}C_6H_5)_2]$,

$[\{P(C_6H_5)_3\}_2Ag(SC\{O\}C_6H_5)_2In(SC\{O\}C_6H_5)_2]$,

$[\{P(C_6H_5)_3\}_2Ag(SC\{O\}C_6H_5)_2Ga(SC\{O\}C_6H_5)_2]$,

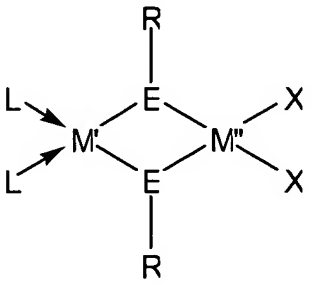
$[\{P(C_6H_5)_3\}_2Ag(SC\{O\}CH_3)_2In(SC\{O\}CH_3)_2]$, and

$[\{P(C_6H_5)_3\}_2Ag(SC\{O\}CH_3)_2Ga(SC\{O\}CH_3)_2]$;

and

b) depositing the single source precursor on a substrate using a spray CVD technique.

41. (original) A method according to claim 40, said single source precursor having a structural formula selected from the group consisting of



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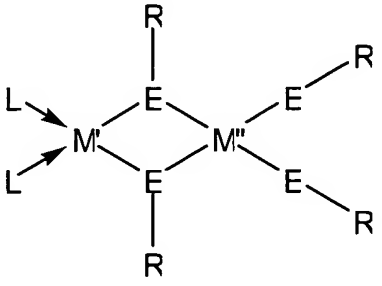
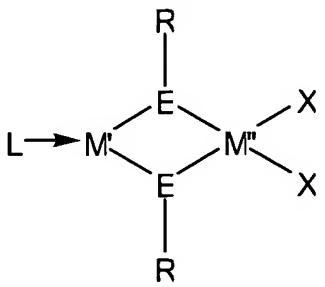


42. (original) A method according to claim 40, said single source precursor having a structural formula selected from the group consisting of



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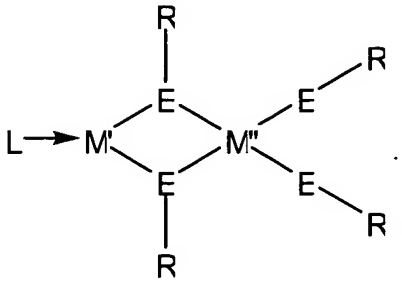
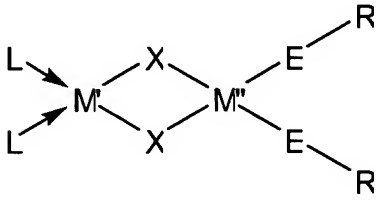


43. (original) A method according to claim 40, said single source precursor having a structural formula selected from the group consisting of



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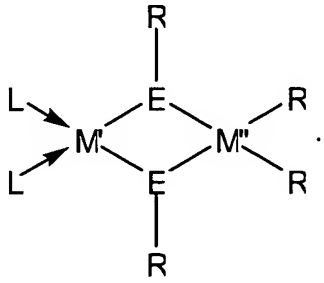
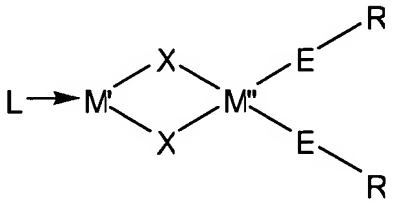


44. (original) A method according to claim 40, said single source precursor having a structural formula selected from the group consisting of



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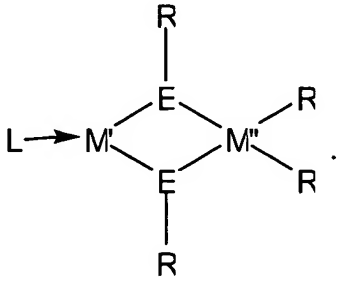

45. (original) A method according to claim 40, said single source precursor having three E-R groups.

46. (original) A method according to claim 40, comprising the steps of providing a second single source precursor, and applying said first and second single source precursors on said substrate via said spray CVD technique.

47. (currently amended) A method of making a single source precursor for the deposition of ternary chalcopyrite materials comprising the step of carrying out the following reaction:

$$4M_{ALK}ER + M'X_3 + M''X + nL \longrightarrow [\{L\}_nM'(ER)_2M''(ER)_2]$$

wherein

M_{ALK} is an alkali metal element,

E is a Group VI-A element,

R is selected from the group consisting of alkyl, aryl, vinyl, perfluoro alkyl, perfluoro aryl, silane and carbamato groups,

M' is a Group **[[**III-A**]]** I-B element,

M" is a Group **[[**I-B**]]** III-A element,

X is a Group VII-A element, and

n is greater than or equal to 1.

48. (original) A method according to claim 47, wherein said single source precursor is made in a single step consisting essentially of said reaction.

49. (original) A method according to claim 47, wherein the ionic complex $[L_{(n)}M''(CH_3CN)_{(4-n)}]^+$ is formed *in situ* as said reaction proceeds.

50. (original) A method according to claim 47, said reaction being carried out under anaerobic conditions.

51. (original) A method according to claim 47, said reaction being carried out under non-anaerobic conditions.

52. (original) A method of making a quantum dot comprising the steps of:

a) providing a single source precursor for a ternary chalcopyrite material; and

b) pyrolyzing said single source precursor to yield a quantum dot made of ternary chalcopyrite material having dimensions less than 100 nanometers.

53. (original) A method according to claim 52, said quantum dot made of a ternary I-III-VI_2 chalcopyrite material.

54. (original) A method according to claim 52, said quantum dot made of a ternary I-III_5-VI_8 chalcopyrite material.

55. (original) A method according to claim 52, said pyrolyzing step being carried out at a temperature less than about 500°C.

56. (original) A method according to claim 52, said single source precursor having the empirical formula $[\{L\}_nM'(ER)_x(X)_y(R)_zM'']$, wherein x is 1-4, x+y+z=4, n is greater than or equal to 1, L is a Lewis base that is coordinated to M' via a dative bond, M' is a Group I-B atom, M" is a Group III-A atom, E is a Group VI-A atom, X is a Group VII-A atom, and each R is individually selected from the group consisting of alkyl, aryl, vinyl, perfluoro alkyl, perfluoro aryl, silane, and carbamato groups.

57. (original) A single source precursor according to claim 2, said single source precursor being effective to yield a I-III_5-VI_8 ternary chalcopyrite material upon heating or pyrolysis of said single source precursor.

58. (original) A single source precursor according to claim 30, said single source precursor being effective to yield a ternary chalcopyrite material having a band gap of 0.5-3.5 eV between a conduction band and a valence band thereof, said ternary chalcopyrite material being $(Cu:Ag:Au)_1(Al:In:Ga)_1(S:Se:Te)_2$.

59. (new) A single source precursor according to claim 2, said Group VI-A atom being selected from the group consisting of S, Se and Te.

60. (new) A single source precursor according to claim 16, said Group VI-A atom being selected from the group consisting of S, Se and Te.